Hypochondriasis. diagnostic issues and treatment.

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Hypochondriasis and non-cardiac chest pain: Differences in psychiatric comorbidity, health anxiety and personality dimensions

Anja Greeven, Anton J.L.M. van Balkom, Eduard van Dijk, Sanne Stricker, & Philip Spinhoven, submitted for publication

Abstract

Introduction: The main objective of the present study was to compare subjects with non cardiac chest pain (NCCP) and hypochondriasis on clinical variables (health anxiety and comorbid diagnoses), and personality traits. Besides, we investigated whether personality traits, like the tendency to avoid fearful situations and of being non-cooperative in social interactions, had a differential effect on a diagnosis of hypochondriasis or NCCP.
Methods: We compared 63 hypochondriasis patients and 69 subjects with NCCP with respect to demographic, and clinical variables, like the presence of a comorbid anxiety disorder, health anxiety (IAS) and personality (Harm Avoidance, Cooperativeness and Self-Directedness), assessed by means of the Abbreviated Dutch Temperament and Character Inventory (TCI).
Results: Compared to NCCP subjects, patients with hypochondriasis were significantly younger, had a significantly loewer level of education and had significantly more comorbid diagnoses. Furthermore, they were significantly more anxious about their health and had more harm avoidant, less cooperative and self-directed personality traits than NCCP subjects and the norm group of healthy controls. Only age and health anxiety predicted psychiatric status.
Conclusion: We conclude that subjects with hypochondriasis have more severe psychiatric characteristics than patients with NCCP and that there is no differential effect of personality on a diagnosis of hypochondriasis or NCCP.

Introduction

Subjects with hypochondriasis are, according to the diagnostic criteria of the DSM-IV, characterized by the misattribution of innocuous somatic sensations to a serious disease for a period of at least 6 months (American Psychiatric Association, 1994). Although patients with hypochondriasis try to reduce their fears by visiting doctors and checking their bodies, the reassurance these actions offer is, unfortunately, of temporarily nature. Contrarily, by performing these actions the vicious circle of the experience of bodily sensations, fearful cognitions and anxiety-reducing behaviors is maintained (Salkovskis and Warwick, 1986). Recently, a growing number of studies have shown that patients with hypochondriasis respond to cognitive behavioral therapy (CBT) directed to identifying, challenging and modifying the misinterpretation of bodily sensations (Warwick, Clark, Cobb, & Salkovskis, 1996; Clark, et al., 1998; Visser & Bouman, 2001; Barsky & Ahern, 2004; Greeven et al., 2006).

A somatoform disorder that seems conspicuously similar to hypochondriasis concerning outward behavior is non-cardiac chest pain (NCCP). NCCP is a so-called functional somatic syndrome, categorized among the undifferentiated somatoform disorders in the DSM-IV (American Psychiatric Association, 1994). Each medical specialty has its own functional somatic syndrome (Wesseley, Nimnuan, & Sharpe, 1999). Subjects with NCCP present at cardiology with a wide variety of cardio- respiratory symptoms (e.g. chest tightening, palpitations, and limb pain) (Bass, 1990), which cannot be explained medically but resemble cardiac problems and are therefore prone to be interpreted as signs of a serious heart condition (Eifert,

1992). As a consequence of this fearful attribution, subjects with NCCP, just like patients with hypochondriasis, resort to anxiety-reducing behaviors in order to avert or prevent the feared catastrophe (Eifert, 1992). CBT based treatments for NCCP focusing on breaking through the vicious circle of cardiovascular complaints – fear – worsening of cardiovascular complaints, have resulted in symptom reduction (Channer, Rees. Papouchado, & James, 1985; Pennebaker & Watson, 1991; Salkovskis, 1992; Eifert, Hodson, Tracey, & Seville, 1996; Mayou et al., 1997; Eifert, Hodson, & Lejuez, 2000).

Besides a similar outward presentation, hypochondriasis and NCCP are frequently accompanied by the same comorbid disorders like panic disorder, generalized anxiety disorder and major depressive episode (Barsky, Wyshak, Klerman, 1992; Noyes, Kathol, Fisher & Phillips, 1994; Greeven, van Balkom, van Oppen, van Rood & Spinhoven, 2007; Esler & Bock, 2004). In addition, subjects with hypochondriasis as well as with functional somatic syndromes like NCCP seem to share the same contributing personality traits. The most salient personality traits are high negative affectivity or neuroticism (the propensity to experience a wide variety of somatic and emotional dysphoric states, including anxiety, depression, anger and somatic symptoms (Watson, Clark, & Harkness, 1994)); high conscientiousness or constraint (operationalized by the tendency to be disciplined, reliable and to avoid harm); and low agreeableness (the propensity to be mistrustful and non-cooperative (Watson et al., 1994; Kirmayer, Robbins, & Paris, 1994; Noyes et al., 2001). This latter characteristic is reflected in subjects' difficult and sometimes conflictual interactions with their physicians (Kirmayer et al., 1994; Noyes et al., 2001).

Several authors hypothesized that hypochondriasis reflects an underlying personality trait such as negative affectivity and should be categorized among the Axis-II disorders (e.g. personality disorders). The significant impairments in social functioning, the (sometimes) early development and chronic course of the disorder when untreated support this assumption (Kirmayer & Robbins, 1991; Tyrer, Kelemen, Fowler-Dixon & Ferguson, 1991).

The main objective of the present study was twofold: (i) to explore the similarities and differences between hypochondriasis and NCCP and (ii) to investigate the relevance of dysfunctional personality traits in the diagnosis of hypochondriasis or NCCP. For these purposes we compared subjects with NCCP and hypochondriasis on demographic characteristics (age and sex), clinical variables (health anxiety and presence of a comorbid anxiety disorder) and personality traits (Harm Avoidance, Cooperativeness and Self-Directedness). Next, we investigated whether personality traits had incremental validity in predicting a diagnosis of hypochondriasis or NCCP. We used norm scores of healthy controls as a reference category.

Methods

Subjects

Subjects with hypochondriasis (N = 63) and subjects with NCCP (N = 69) were both included within the framework of two separate randomized controlled trials (RCT's) comparing the efficacy of cognitive behavioral therapy, paroxetine and a placebo (Greeven et al., 2007; van der Does, van

Dijk, van Rood, & Spinhoven, submitted). For the present sub-study no special eligibility criteria were required.

For the trial on the efficacy of CBT and Paroxetine for hypochondriasis, subjects from age 18 meeting the DSM-IV criteria for Hypochondriasis (American psychiatric Association, 1994) were included. The presence of hypochondriasis was assessed by means of the Structured Clinical Interview for DSM-IV Axis-I Disorders (SCID) (First, Spitzer, Gibbon, & Williams, 1996). Diagnosis and treatment took place at three psychiatric outpatient clinics in the Western region of the Netherlands. Subjects with hypochondriasis suffering from a comorbid mood disorder, anxiety disorder, and other somatoform disorders were included only when they indicated hypochondriasis to be the psychiatric disorder they suffered the most. Concomitant use of benzodiazepines was permitted to a maximum of the equivalent of 30mg oxazepam, but only if subjects had been taking benzodiazepines for more than 3 months and were willing to keep use at a constant dosage for the duration of the trial.

In the NCCP group, eligible participants were cardiology outpatients of two academic and two non-academic hospitals who had been discharged with a diagnosis of NCCP. Inclusion criteria were: NCCP as main presenting complaint; NCCP occurring at least once a week, or more than once per month accompanied by severe psychological distress, and age from 18. Exclusion criteria were: major depression, and use of any psychotropic medications (including beta-blockers if prescribed for anxiety).

Furthermore, for both studies exclusion criteria were the same. Excluded were subjects whose complaints could be explained by somatic abnormalities; comorbid psychotic disorders, substance-use disorders and

organic mental disorders. Pregnant and lactating women and subjects with severe medical illnesses were also excluded. Concomitant use of antidepressants, mood stabilizers, antipsychotics and anticoagulants, an allergy for SSRI's and being in psychotherapy for Hypochondriasis or NCCP elsewhere were also exclusion criteria.

Design and procedure

Subjects with Hypochondriasis were assessed for eligibility for the trial by means of an intake session with an experienced psychiatrist who did a psychiatric assessment. In case subjects did not use antipsychotics, mood stabilizers and antidepressants at the time of the intake session the diagnosis was immediately confirmed by means of the SCID for DSM-IV Axis I (First et al., 1996) and written informed consent was obtained. Those who used these drugs and were willing and/or able to stop taking them, started tapering-off supervised by the intake psychiatrist. When subjects remained drug-free for 4 weeks (in case of fluoxetine 5 weeks) the diagnosis was confirmed and written informed consent was obtained.

The recruitment of subjects with NCCP consisted of three phases. In phase 1, all charts of the participating clinics were reviewed for diagnostic information. Subjects diagnosed with NCCP received a letter by mail, signed by the head of the cardiology department, with information about the study. The letter also included a short questionnaire, asking about current frequency and severity of chest pain and about psychological distress. In phase 2, individuals who seemed to fulfill inclusion criteria and who expressed interest in the study were invited for an appointment at the academic hospital in which they received detailed oral and written

information about the study by a physician. One week later these subjects were contacted to hear whether they were interested in participating. Those interested were sent a chest pain diary and were invited for an intake assessment and physical examination three weeks later (phase 3).

In case subjects with hypochondriasis and NCCP met the inclusion criteria and were willing to participate, they gave informed consent to the procedure and were randomized. Prior to treatment they filled in a pretest assessment consisting of among others the instruments described in the next paragraph. Both RCT's had been approved by the ethical committees of the medical centers involved.

Instruments

To establish the presence of a comorbid anxiety disorder we used respectively the SCID for subjects with hypochondriasis and the MINI for subjects with NCCP. The interviews were administered by experienced psychiatrists and have good psychometric properties (First et al., 1996; Sheehan et al., 1998). Validation of the MINI against the SCID showed good to very good κ values (Sheehan et al., 1998). Presence of the following anxiety disorders was asked: panic disorder, agoraphobia, social phobia, post traumatic stress disorder and generalized anxiety disorder.

Health anxiety was assessed with the subscale Health Anxiety of the Illness Attitudes Scales (IAS). The IAS were originally developed by Kellner (1987) and consisted of nine a-priori subscales: 1) worry about illness; 2) concerns about pain; 3) health habits; 4) hypochondriacal beliefs; 5) tanatophobia (fear of death); 6) disease phobia; 7) bodily preoccupation; 8)

treatment experience; and 9) effects of symptoms. In a Dutch study determining the factorial structure of IAS in a clinical population a two factorial structure was obtained: health anxiety and illness behavior (Speckens, Spinhoven, Sloekers, & Bolk, 1996). Items are scored on a five point Likert-scale ranging from 0 through to 4. High scores on this questionnaire, indicate high levels of health-related fears. Scores of a norm group were collected within the framework of a previous study (Speckens et al., 1996) in a random sample (n = 204) of persons registered at the same general practice.

Personality was assessed using the Abbreviated Dutch Temperament and Character Inventory (TCI; Duijsens, Spinhoven, Verschuur, Eurelings-Bontekoe, 1999), a shortened version of Cloningers Temperament and Character Inventory (Cloninger, Svrakic, & Przybeck, 1993). The TCI was developed to measure four dimensions of temperament and three dimensions of character. The dimensions of temperament include 1) novelty seeking (inquisitiveness and impulsiveness); 2) harm avoidance (precariousness, fearfulness, timidity and vulnerability; 3) reward dependence (sentimentality, intimacy, dependency); and 4) persistence (diligence and perfectionist behavior).The dimensions of character include: 1) self-directedness (responsibility, purposive, ingeniousness), 2) cooperativeness (tolerance, helpfulness, forgivingness, consciousness) and 3) self-transcendence (creativity, spirituality, contentedness). The Dutch Temperament and Character Inventory has satisfactory to good psychometric properties (Duijsens, Spinhoven, Goekoop, Spermon, & Eurelings-Bontekoe, 2000). The TCI is a dichotomous (true/false) self-report measure consisting of 105 items (each subscale comprises 15 items). The

norm group consisted of a random selection of a mailing list of 1034 healthy controls (Dutch sample, n = 399 and a Flemish sample, n = 635). For this study only the subscales harm avoidance, cooperativeness and self-directedness were used because of their assumed relationship with somatoform disorders. Besides, both harm avoidance and self-directedness correlate, respectively positively and negatively, with the subscale neuroticism of NEO-PI-R (de Fruyt, van de Wiele, & van Heeringen, 2000).

Statistical analysis

Prior to analysis, the scores on the questionnaires were examined for accuracy of data entry, missing values, and fit between their distributions and the assumptions of parametric testing. For demographic and clinical variables on nominal level, we used chi-square statistics to determine group differences and independent samples t-tests for variables on interval level. Comparisons of both somatoform groups with the norm group of healthy controls were conducted using one-sample t-tests. Tests were conducted two-sided with alpha values were set at 0.05.

In case of significant differences we conducted a hierarchical multiple regression analysis to assess whether these variables predicted a diagnosis of hypochondriasis or NCCP. The first block contained demographic characteristics, the second block clinical variables, like health anxiety and the presence of a comorbid anxiety disorder. Personality was forced into a third block into the regression equation to investigate its unique contribution. Before conducting the regression analysis we checked for multicollinearity by calculating Pearson correlations

Results

The charts review identified 3,270 subjects diagnosed with NCCP. These subjects were approached by mail. Of these, 2,367 subjects (72.4%) returned the questionnaire about current symptoms, of whom 583 (24.6%) had no interest in the study, and 1,310 (55.3%) did not fulfill the inclusion criteria regarding chest pain frequency. The remaining 474 potential participants received detailed information about the study and were invited for a screening and information session. After the screening session, 95 subjects (20.0%) agreed to be randomized. The most often mentioned reasons to decline participation were unwillingness to be randomized to an antidepressant (approximately 80%) and / or lack of time. .After the intake, 26 subjects had to be excluded, leaving 69 subjects (37 males) who started the trial. Reasons for exclusion were: too few chest pain episodes during the three-week baseline measurement (n = 6); physical exam revealed non-cardiac somatic illness explaining chest pain (n = 10); major depression (n = 6); personality disorder (n = 4).

Of a total of 147 subjects with Hypochondriasis assessed with the SCID, 35 subjects (24%) were excluded because of the following: (1) the most disabling diagnosis did not appear to be hypochondriasis, but another disorder (n = 17, 49%); (2) they were unable or unwilling to stop antidepressants (n = 8, 23%); or finally (3) they refused informed consent (n = 10, 28%). Of the remaining 112 subjects randomized, 74 (66%) had been referred by their general practitioner and 38 (34%) responded on articles in newspapers (34%). Referral by a general practitioner or self-referral did not result in any differences on demographic and psychiatric status variables

In order to prevent that differences in outcome could be due to dissimilar in- and exclusion criteria it was decided to exclude hypochondriacal subjects suffering from a comorbid mood disorder and/or using benzodiazepines (N=49), leaving 63 cases for analysis. Furthermore, to maximize the possible differences between subjects with hypochondriasis and NCCP, it was decided to remove those subjects from the NCCP group suffering from comorbid hypochondriasis (N = 2), leaving 67 of NCCP cases for analysis. It was decided to keep hypochondriacal subjects with chest pain (N = 7) within the analysis, since chest pain is a common complaint of hypochondriacal subjects and not an additional diagnosis, that might interfere with the results.

Gender and marital status were distributed similarly in the two groups. Subjects with NCCP were, however, significantly older than subjects with hypochondriasis ($t = 7.546$, $df = 128$, $p < 0.001$). Moreover, their general level of education was lower ($\chi^2 = 4.301$, $df = 1$, $p = 0.04$). All available demographic variables are summarized in table 1.

Table 1: Demographic variables in subjects with hypochondriasis (n = 63) and subjects with NCCP (n = 67)

	hypochondriasis	NCCP
Age, m, sd	40.9 ± 12.7.	56.3 ± 10.5
female sex, n (%)	35 (56)	32 (48)
Low level of education, n (%)	36 (57)	49 (75)
Married/living together, n (%)	45 (71)	51 (77)

Comorbid Anxiety diagnosis

Subjects with hypochondriasis were significantly more often diagnosed with comorbid social phobia and generalized anxiety disorder. Both groups were equally often diagnosed with panic disorder and posttraumatic stress disorder (see table 2).

Table 2: The presence of comorbid diagnoses in subjects with hypochondriasis (N = 63) and subjects with NCCP (N = 67)

	Hypochondriasis, n (%)	NCCP, n (%)	p-value [a]
any anxiety disorder	33 (52)	20 (30)	<0.005
panic disorder	17 (27)	17 (25)	0.42
social phobia	7 (11)	1 (1)	0.02
posttraumatic stress disorder	3 (3)	1 (1)	0.52
generalized anxiety disorder	10 (16)	1 (1)	< 0.005

Health related fears and personality characteristics

As shown in table 3, subjects with hypochondriasis had significantly more hypochondriacal complaints than the NCCP subjects and the norm group of healthy controls. Moreover, they scored significantly higher on the subscale harm avoidance and significantly lower on the subscales cooperativeness and self-directedness than both other groups.

Subsequently a subgroup analysis was conducted in the NCCP group to examine whether NCCP subjects with additional anxiety diagnoses differed from NCCP subjects without additional anxiety diagnoses. These

analyses revealed no differences in the severity of health anxiety and psychopathological personality characteristics between both subgroups.

Table 3: Means and standard deviations of all groups on the Health Anxiety subscale of the IAS and on the subscales harm avoidance, cooperativeness and self-directedness of the TCI

	Hypochondriasis (1) N = 63	NCCP (2) N = 67	Controls (3)	p-value[a]
Health anxiety	28.2 ± 7.2	11.1 ± 6.4	9.1 ± 6.9	1 > 2*** 1 > 3***; 2 > 3*
Harm avoidance	10.1 ± 3.5	6.2 ± 3.4	6.3 ± 4.0	1 > 2*** 1 > 3***; 2 = 3
Cooperativeness	11.9 ± 2.7	13.1 ± 1.8	12.7 ± 2.6	1 < 2**; 1 < 3**; 2 = 3
Self-directedness	10.4 ± 3.7	11.9 ± 2.5	12.1 ± 3.0	1 < 2**; 1 < 3***; 2 = 3

***p ≤ 0.001, **p < 0.01, *p < 0.05

Prediction of diagnostic status

We explored the relation between the different predictors by calculating Pearson correlations. Table 4 shows that age was significantly and negatively related to health anxiety and significantly and positively to self-directedness. Furthermore, health anxiety was significantly and positively related to harm avoidance and significantly and negatively to cooperativeness and self-directedness. Moreover, a significant negative correlation between harm avoidance and cooperativeness and harm avoidance and self-directedness was found. Finally, a significant positive correlation between self-directedness en cooperativeness was found. The strength and the direction of the correlations between the subscales of the

TCI are largely in line with research results on this questionnaire (Duijsens, Spinhoven, Verschuur & Eurelings-Bontekoe, 1999).

Table 4: Pearson correlations of subjects with hypochondriasis and NCCP between the Health Anxietysubscale of the IAS and the subscales harm avoidance and cooperativeness of the TCI

	Health Anxiety	Harm avoidance	Cooperati-veness	Self-directedness
Age	-0.41**	-0.24**	0.13	0.22*
Health anxiety		0.54**	-0.26*	-0.24*
Harm avoidance			-0.28**	-0.56**
Cooperativeness				0.37**

** $p < 0.01$; * $p < 0.05$

For the hierarchical linear regression analysis we forced age and level of education in the first block. The second block added health anxiety and presence of comorbid anxiety disorder and the third block contained harm avoidance, self-directedness and cooperativeness. A test of the model with only age and level of education as a predictor against a basis model was statistically reliable ($\chi^2 = 46.784$, df = 1, $p < 0.001$). The addition of health anxiety and presence of a comorbid anxiety diagnosis was significant ($\chi^2 = 81.661$, df = 2, $p < 0.001$), indicating that the predictors, as a set, reliably distinguished between hypochondriasis and NCCP. Finally, in the third block we enclosed the three personality factors. This addition was not significant, suggesting that the variables did not results in a significant improvement of the previous model ($\chi^2 = 4.381$, df = 3, $p = 0.22$). Table 5 shows regression coefficients, standard errors, p-values and odds ratios for each significant predictor. Only age and health anxiety were significant predictors of diagnostic status. Subjects with hypochondriasis are much more likely to have health anxiety and a younger age. Presence of a

comorbid anxiety disorder, harm avoidance, cooperativeness and self-directedness were no unique predictors.

Table 5. Logistic Regression Analysis of diagnostic group as a function age, clinical and personality variables

Variable	χ^2	β	SE β	p-value[a]	Odds ratio (95% CI)
Block 1	46.784				
Age		0.105	0.20	<0.001	0.90 (0.87 – 0.94)
Block 2	128.446				
Age		-0.15	0.42	< 0.001	0.86 (0.79 – 0.94)
Heath Anxiety		0.39	0.09	< 0.001	1.48 (1.239 – 1.763)

Discussion

According to the results of this study subjects with hypochondriasis are more afraid of suffering from a serious disease. Although this finding was to be expected, the extent of the differences (of more than two standard deviations) is quite striking. Nevertheless, although subjects with hypochondriasis suffered compared to subjects with NCCP, more frequently from a comorbid social phobia and generalized anxiety disorder, both groups did not differ in the prevalence of comorbid panic disorder (approximately one quarter). Furthermore, subjects with NCCP reported significantly more health anxiety than did the members of the control group.

Posthoc analyses comparing NCCP subjects with and without comorbid anxiety diagnoses revealed no differences. This finding excludes the possibility of two separate subgroups: on the one hand anxious NCCP subjects with comorbid anxiety disorders and fears which resemble those of

subjects with hypochondriasis and on the other hand NCCP subjects who suffer from unexplained physical complaints unaccompanied by pronounced levels of anxiety. The absence of severe hypochondriacal fears and worries, however, does not deny the presence of health anxiety in subjects with NCCP. One of the most plausible interpretations for the present study results is that although NCCP subjects only show modest higher levels of health anxiety than normal controls, they can be better characterized by their very circumscribed fears and worries related to cardiorespiratory sensations, which apparently are not sufficiently captured by a more general questionnaire such as the IAS assessing the broad spectrum of heath concerns and worries. The finding that a considerable part of all NCCP subjects suffered from a comorbid panic disorder is in line with this hypothesis.

With respect to personality traits we found that subjects with hypochondriasis were significantly more harm avoidant, less self-directed and less cooperative than NCCP subjects and healthy controls. They were, in other words, more prone to ruminate, feel insecure and vulnerable. In addition, they were more inclined to place responsibility for circumstances on external causes and to take a selfish, intolerant attitude towards others. Since there is a highly significant positive correlation between neuroticism and harm avoidance and a significant negative correlation between neuroticism and self-directedness (de Fruyt, van de Wiele, & van Heeringen, 2000), we can generalize our results to those obtained using the big five factor model as personality measure and conclude that they are in line with the existing literature. Former studies found a close positive relation between the extent of neuroticism and hypochondriacal symptoms in

subclinical and clinical populations (Pennebaker & Watson, 1991; Cox, Borger, Asmundson, & Taylor, 2000; Ferguson, 2000). Noteworthy is that we found no significant differences between NCCP and healthy control group subjects in personality traits. Our results correspond to the results of one previous study which not identified neuroticism as a psychological risk factor for developing NCCP (Eslick, Jones, & Talley, 2003).

To find out whether age, the presence of a comorbid anxiety disorder, the extent of health anxiety, harm avoidance, cooperativeness and self-directedness predicted membership to a diagnostic group we conducted a logistic regression analysis. The principal finding of this analysis was that being younger and more anxious about health predicted a diagnosis of hypochondriasis. The finding that our sample of NCCP subjects was older than our subjects with hypochondriasis is in accordance with previous studies on NCCP, which report a mean age of NCCP subjects varying from 49 to 58 years (van Peski-Oosterbaan et al., 1999; Cheng et al., 2003)

The finding that subjects with hypochondriasis had significantly more abnormal personality traits than NCCP and healthy control subjects, but that none of these traits predicted the presence of hypochondriasis is interesting, but we have to be careful not to underestimate the influence of personality in case of hypochondriacal complaints. Table 4 clearly shows a significant positive correlation between the severity of health anxiety and harm avoidant tendencies. Moreover, although less strong the negative correlations between health anxiety and respectively cooperativeness and self-directedness were also significant. Possibly, these correlations suggest that these temperament and character dimensions reflect state components which fluctuate depending on the severity of the health concerns instead of

trait components which are stable and independent of severity of hypochondriacal complaints. The results question the influence of abnormal personality traits as a predisposing factor in the etiology of hypochondriasis (Tyrer et al., 1991), but suggest that health anxiety and personality are interwoven and maintain each other in a non functional vicious circle. For example, the disease convictions and the corresponding repetitive unsatisfying visits to doctors, who often lack understanding for these complaints, might explain the uncooperative style of hypochondriacs. The uncooperative style strengthens the difficult relationship between doctor and patient, in which mutual lack of understanding dominates, increasing the risk of deteriorating hypochondriacal complaints.

Previous studies investigating the stability of personality characteristics during an episode of depression, found evidence for fluctuating personality characteristics. Especially the extent of neuroticism shows depression-related changes during treatment (e.g.,Griens, Blom, Jonker, & Spinhoven, 2002). Although a recent large-scale study demonstrated that most of the Big Five personality traits remained relatively stable after 6-month of pharmaco-psychotherapy for major depression, also in this study emotional stability proved to be state-dependent (de Fruyt et al., 2006).

Further prospective studies in which the assessment of personality precedes the onset of hypochondriasis are needed in order to draw more definitive conclusions about whether a certain personality constellation makes people vulnerable for developing hypochondriasis or whether dysfunctional personality traits primarily reflect a complication of hypochondriasis.

This study has a number of limitations that must be considered in evaluating the results. At first, the absence of a somatoform disorder control group for comparison. It can not be ruled out that the finding that NCCP subjects had more hypochondriacal symptoms than the healthy control group is attributed to a non-specific increase of symptoms found in subjects with somatoform disorders generally. Second, because subjects were selected within the framework of two different RCT's, it could be that a selective sample of hypochondriacal subjects and NCCP subjects was recruited. Especially in the NCCP group this could be problematic, because subjects suffering from comorbid depression were ruled out from inclusion. Depression frequently co-occurs with NCCP (Esler & Bock, 2004) and could be an important indicator for severity. To correct for a possible confounding role of comorbid depression in subjects with hypochondriasis, however, depressive hypochondriacal subjects were also excluded from the analysis. Third, personality was assessed by means of self-descriptions, which are difficult to interpret because they can reflect true and reliable judgements of personality, but also distortions in self-descriptions due to severity of psychiatric symptoms or a temporarily personality change secondary to a psychiatric disorder (Costa, McCrae, Bagby, & Herbst, 2005; de Fruyt, Rolland, Rouillon, van Leeuwen, & Bagby, 2006).

Third, personality traits were measured by self-report only and no attempt was made to assess the presence of personality disorders according to DSM-IV or ICD-10 criteria using semi-structured interviews such as the SCID-II (First, Spitzer, Gibbons, & Williams, 1997) or IPDE (Loranger, Janca, & Sartorius, 1996). It remains to be established whether a categorical in stead of dimensional assessment of personality dysfunctioning also would have

failed to predict diagnostic status over and above sociodemographic and illness related variables. In the absence of prospective studies, it cannot be excluded that subjects with hypochondriasis suffer more often from Axis-II disorders, which make them vulnerable for developing hypochondriacal complaints. A previous study found indeed that somatizing subjects (somatoform, depressive and anxiety disorders) met criteria for one or more personality disorders (Noyes et al., 2001). Therefore, future prospective research is needed to study to what extent personality traits but also personality disorder categories as assessed on Axis II of the DSM-IV (American psychiatric Association, 1994) represent a vulnerability factor for developing hypochondriasis.

To the best of our knowledge, this study is the first attempt to compare NCCP and hypochondriasis subjects on psychiatric co-morbidity, the extent of health anxiety and personality characteristics. A primary objective of our study was to investigate the differential effect of personality on psychiatric status. On basis of our findings we conclude that the subjects with hypochondriasis have more severe psychiatric symptoms than subjects with NCCP and that there is no differential effect of personality traits on a diagnosis of hypochondriasis or NCCP.